

IN THE CLAIMS:

This listing of claims replaces the prior listing of claims. Please amend the claims as follows:

CLAIMS:

What is claimed is:

1. (Currently Amended) ~~In a~~ retrofitted gas flow catalyst bed reactor assembly, comprising:

 an existing gas flow catalyst bed reactor assembly comprised of:

 ~~an outer~~ reaction vessel, ~~an inner~~ displacement cylinder within said
reaction vessel, said displacement cylinder having an interior wall and an
exterior wall, and an annular catalyst bed between an inner surface of the
reaction vessel and the exterior of ~~surrounding the displacement cylinder~~
having a top half and a bottom half, wherein the reactor is retrofitted by
~~improvement comprising adding at least one baffle to~~ an outside of the top
half of the displacement cylinder to improve uniformity of fluid flow in the
reaction vessel and across the catalyst bed.

2. (Currently Amended) The assembly of claim 1 wherein at least three
baffles are added to the exterior of the displacement cylinder.

3. (Currently Amended) The assembly of claim 1 wherein the annular catalyst bed is annular and is positioned at a distance from the displacement cylinder, and wherein the at least one baffle does not extends ~~into the reaction vessel for a distance limited by more than half of~~ a distance from the displacement cylinder to an inner wall of the catalyst bed.

4-8. (Canceled)

9. (New) The assembly of claim 1 having a series of flow baffles that extend radially outward from the displacement cylinder to direct a longitudinal flow of gases in the catalyst bed into a radial flow, to thereby improve a uniformity of said gas flow across the catalyst bed.

10. (New) The assembly of claim 1 wherein the existing reactor can be modified without disassembling the reactor.

11. (New) The assembly of claim 10 wherein the displacement cylinder is of a sufficient width for cutting a man way into the top to thereby allow retrofitting of the baffles from an inside of the displacement cylinder.

12. (New) The assembly of claim 11 wherein the cylinder wall is cut at a desired location to allow insertion of the baffles through the wall and welding of the baffles from the inside of the displacement cylinder.
13. (New) The assembly of claim 1 wherein at least two baffles are added to the top half of the displacement cylinder of the reactor to allow more uniform fluid flow through the reactor.
14. (New) The assembly of claim 13 wherein the addition of the baffles cause a minimal increase in pressure drop and a maximum effect on fluid flow normalization.
15. (New) The assembly of claim 1 wherein the catalyst is comprised of a concentric cylindrical catalyst shell made of a perforated or porous inner wall and a perforated or porous outer wall.
16. (New) The assembly of claim 1 further comprised of an ethylbenzene feedstock, wherein said assembly facilitates dehydrogenation of ethylbenzene into styrene monomer.

17. (New) A method for retrofitting the assembly of Claim 1 for ethylbenzene dehydrogenation, comprising:

obtaining an ethylbenzene dehydrogenation reactor that has an outer reactor shell, an inner displacement vessel having an interior wall and an exterior wall, and a catalyst bed located between the reactor shell and the inner displacement vessel, wherein said reactor catalyst bed is constructed without baffles;

evaluating the dehydrogenation reactor for retrofitting with baffles
simulating fluid flow through the reactor to reflect actual operations;

simulating fluid flow improvements, wherein said improvements comprise addition of baffles to the displacement column at locations that exhibit higher fluid flow velocities;

using simulation to determine a location, size, and number of baffles to provide a more uniform fluid flow;

wherein the flow simulation is comprised of a steady state flow simulation; and

wherein baffles are added to the exterior of the displacement column based upon simulation results, without disassembling the reactor.

18. (New) The method of claim 17 wherein the flow simulation is comprised of a cold flow simulation conducted using a two-dimensional axis-symmetric reactor model

19. (New) The method of claim 17 wherein the flow simulation is comprised of calculation of a velocity profile and pressure for each cell within a geometry of the reactor.

20. (New) The method of claim 17 wherein the baffles are attached to the exterior of the displacement cylinder at specific locations to reduce a flow rate in the higher fluid velocity locations of the reactor.

21. (New) A process for improving catalyst life in an ethylbenzene dehydrogenation reactor using the method of claim 17, wherein the fluid flow simulations are conducted using actual reactor conditions, and wherein at least two baffles are added to the outside of the displacement vessel based upon said simulations to improve simulated fluid flow.

22. (New) The assembly of claim 1 wherein said baffles extends a catalyst life by increasing an efficiency of a flow in the reactor both in the axial and vertical directions.